

**REMARKS**

Claims 1-11, 21, 22 and 25-30 are pending in this application. Claims 1 and 22 have been amended by the present Amendment. No new matter is added by the amendments to claims 1 and 22.

Applicants respectfully submit that the amendments to claims 1 and 22 place the claims in better form for appeal, and respectfully request that the Amendment be entered for purposes of appeal.

**REJECTION UNDER 35 U.S.C. § 112**

Reconsideration is respectfully requested of the rejection of claims 1-11, 21-22 and 25-30 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The Examiner maintains that in claims 1 and 22, "it is unclear relative to what element each head unit is shifting."

Applicants respectfully disagree with the Examiner, but have amended claims 1 and 22 to further clarify claims 1 and 22.

Claim 1, as amended, recites that "each head unit . . . is fixed in a position spaced apart from a previous head unit by a predetermined horizontal shift distance from the previous head unit".

Claim 22, as amended, recites "each head unit being disposed in a position spaced apart from a previous head unit by a predetermined horizontal shift distance from the previous head unit".

The head units are shifted with respect to each other. For example, FIGS. 3-4 of

Applicants' disclosure show the head units 300-1 . . . 300-n, wherein each successive head unit is spaced apart from a previous head unit by a horizontal shift distance  $d$  from the previous head unit, which is less than a pitch between nozzles 400.

Examiner's Interpretation of Claims 1 and 22

The Examiner maintains that "each head unit is fixed or disposed in a position spaced apart from a previous head unit by a predetermined horizontal shift distance relative to the substrate disposed on the stage". See December 12, 2006 Office Action at 2.

Applicants respectfully submit that claims 1 and 22 are not so limited. As stated above, each head unit is fixed or disposed in a position spaced apart from a previous head unit by a predetermined horizontal shift distance relative to the previous head unit.

For example, a spraying device 700, having a plurality of head units fixed or disposed on the spraying device 700, may form an angle with respect to a side of the mother substrate. See, e.g., Applicants' disclosure, ¶¶ 0075-76; FIG. 7. Accordingly, each head unit, which is then angled with respect to the substrate, does not appear to be spaced apart from a previous head unit by a predetermined horizontal shift distance relative to the substrate.

Further, if, for example, a spraying device 240, having a plurality of head units fixed or disposed on the spraying device 240, remains stationary while a substrate on a stage moves, it is not clear how head units can be shifted relative to a moving substrate. See, e.g., Applicants' disclosure, ¶¶ 0082-83; FIGS. 8-9; see also claims 9-10.

The Examiner also maintains that "each head unit is fixed or disposed in a

position, [and] is considered to be 'not moving' relative to the substrate disposed on the stage." See December 12, 2006 Office Action at 9.

Applicants respectfully submit that at least claim 1, as amended, is not so limited.

For example, a spraying device 1200, having a plurality of head units fixed or disposed on the spraying device 1200, may move while a substrate on a stage remains fixed. See, e.g., Applicants' disclosure, ¶¶ 0095-96; FIG. 12; see also claim 11. Therefore, the head units spaced apart from each other in the claimed configuration can be fixed or disposed on a movable spraying device.

Accordingly, Applicants submit that claims 1 and 22, as amended, are not indefinite.

Applicants, therefore, respectfully request that the Examiner's rejection under 35 U.S.C. § 112, second paragraph, be withdrawn.

#### **REJECTIONS UNDER 35 U.S.C. § 103**

Reconsideration is respectfully requested of the rejection of claims 1, 3-11, 21 and 29 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,660,332 ("Kawase '332") in view of European Patent Application Pub. No. EP 0754553 ("EP '553").

Reconsideration is also respectfully requested of the rejection of claims 1-11, 21-22, 25-30 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application Publication No. US2003/0186613 ("Kawase '613") in view of EP '553.

Applicants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness with respect to the pending claims.

M.P.E.P. § 2143 states:

"To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

M.P.E.P. § 2143 (Rev. 8/06).

Kawase '332 and Kawase '613 Fail To Disclose A Multiple Of The Shift Distance Is Substantially Identical To The Pitch And The Pitch Being Substantially Identical To N Times The Predetermined Horizontal Shift Distance

Nowhere in Kawase '332 or Kawase '613 are there any statements outlining a relationship between shift distance and nozzle pitch. In Kawase '332, every visual reference to a difference from one position of the head unit 22 to another position of the head unit 22 shows a difference of position which is greater than a pitch between nozzles, not less than a pitch between nozzles. See, e.g., Kawase '332, FIGS. 1-4. Similarly, in Kawase '613, every visual reference to a difference between ejection start points of droplet ejection units (25A-25C) shows a difference which is greater than a pitch between nozzles, not less than a pitch between nozzles. See, e.g., Kawase '613, FIG. 9 (references P21, P22 and P23).

The Examiner maintains that Kawase '332 discloses a device that "is capable of being sized as having a head unit spaced apart from previous head by a predetermined

horizontal shift of the plurality of head units, wherein . . . the nozzle pitch is greater than the horizontal shift distance", and that Kawase '613 "is capable of having a multiple of predetermined horizontal shift distance between the head units, which is capable of being identical to the pitch and/or the horizontal shift distance is less than the pitch".

The Examiner does not cite any support for this contention. Indeed, Examiner's conclusions are based entirely on speculation and hindsight gleaned from Applicants' disclosure.

Further, EP '553 does not disclose or suggest the claimed configuration. See Applicants' December 15, 2005 Amendment, at 7-8 (discussing EP '553 and its failure to disclose a pitch between nozzles which is greater than shift distance).

Accordingly, the Examiner has not adequately established that the cited references teach or suggest a multiple of the shift distance is substantially identical to the pitch and the pitch being substantially identical to n times the predetermined horizontal shift distance.

There Is No Suggestion Or Motivation To Modify Kawase '332 Or Kawase '613 To Include A Nozzle Pitch That Is Greater Than The Horizontal Shift Distance

Applicants respectfully submit that there is no suggestion to modify Kawase '332 or Kawase '613 to include the claimed relationship between nozzle pitch and shift distance because the cited references teach away from the claimed relationship and the cited references are not analogous to the claimed embodiments.

Embodiments of the present invention relate to an apparatus for forming an organic layer wherein the interval between the organic material drops is minimized to achieve uniformity of the organic layer. See, e.g., Applicants' disclosure ¶¶ 0011. The organic material can be used to form a black matrix, and the reduced interval is

achieved by implementing a horizontal shift distance of head units that is less than the nozzle pitch.

*The Cited References Teach Away From The Reduced Interval*

Unlike the claimed embodiments, a stated objective of Kawase '332 and Kawase '613 is to avoid overlap of ink ejection start and end points. For example, Kawase '332 seeks to prevent dense lines from forming on a color filter at positions corresponding to ends of a nozzle line, where the amount of ink discharged is the greatest. See, e.g., Kawase '332, col. 2, lines 13-28. Similarly, Kawase '613 seeks to achieve uniformity of a color filter by controlling the amount of ink deposited in colored areas by avoiding overlap of the end positions of nozzle rows. See, e.g., Kawase '613, ¶¶ 0018, 0131-0132. Avoidance of overlap is obtained by the configurations, shown in, for example, Figs. 1 and 3 of Kawase '332 and Figs. 3, 4 and 9 of Kawase '613.

Accordingly, Kawase '332 and Kawase '613 teach away from the claimed relationship between nozzle pitch and shift distance, which results in overlap between end positions of nozzle rows. Indeed, modifying Kawase '332 or Kawase '613 to include the claimed configuration would render Kawase '332 and Kawase '613 unsatisfactory for their intended purposes of forming a uniform color filter because the overlap of the nozzles would result in the dense lines that Kawase '332 and '613 seek to avoid. See, e.g., M.P.E.P. § 2143.01 (Rev. 8/06) ("If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification." *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984)).

As such, Applicants respectfully submit that there is no motivation to have pitch

between nozzles that is greater than the shift distance (or  $n$  times the shift distance) because such a configuration results in the overlap that Kawase '332 and Kawase '613 seek to avoid.

*The Cited References Are Not Analogous To The Claimed Embodiments*

As stated above, the embodiments of the present invention relate to an apparatus for forming an organic layer. Specifically, the organic layer can be used to form a black matrix. See, e.g., Applicants' disclosure, ¶ 0005. A spraying device sprays the organic material, and includes a nozzle pitch that is greater than the horizontal shift distance in an effort to produce a uniform organic layer.

In contrast to the claimed embodiments, Kawase '332, Kawase '613 and EP '553 relate to ink ejecting apparatuses for manufacturing color filters, not spraying devices for spraying organic material to form a black matrix. Indeed, unlike the claimed embodiments, the ink ejecting apparatuses preferably avoid overlap to achieve uniformity of a color filter, whereas the apparatus of the claimed embodiments seeks overlap to achieve uniformity of the organic layer. Therefore, because of the differences between the cited references and the claimed embodiments, one of ordinary skill in the art would not look to the cited references to develop the claimed embodiments.

Accordingly, the cited references are not analogous to the claimed embodiments, and cannot be used to support an obviousness rejection.

Therefore, it is respectfully submitted that the Examiner has failed to establish a *prima facie* case of obviousness of claims 1 and 22, and the claims dependent thereon, based on the cited references.

As such, Applicants respectfully request that the Examiner withdraw the rejections of claims 1-11, 21-22 and 25-30 under 35 U.S.C. § 103(a).

**DEPENDENT CLAIMS**

Applicants have not independently addressed the rejections of all the dependent claims because Applicants submit that, for at least similar reasons as why the independent claims from which the dependent claims depend are believed allowable as discussed, supra, the dependent claims are also allowable. Applicants however, reserve the right to address any individual rejections of the dependent claims should such be necessary or appropriate.

An early and favorable reconsideration is earnestly solicited. If the Examiner has any further questions or comments, the Examiner may telephone Applicants' Attorney to reach a prompt disposition of this application.

Respectfully submitted,

  
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